3-30-1984

Test 1510: Ford 2110 (12x4) Synchro Diesel

Tractor Museum
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NEBRASKA TRACTOR TEST 1510
FORD 2110 (12x4) SYNCHRO DIESEL
12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F *(°C)* Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—564 rpm)								
35.11 *(26.18)*	2500	2.539 *(9.609)*	0.506 *(0.308)*	13.83 *(2.725)*	201 *(94.0)*	58 *(14.3)*	75 *(23.6)*	28.95 *(97.76)*
Standard Power Take-off Speed (540 rpm)—One Hour								
35.56 *(26.52)*	2394	2.539 *(9.611)*	0.500 *(0.304)*	14.01 *(2.759)*	206 *(96.7)*	58 *(14.4)*	76 *(24.3)*	28.95 *(97.76)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
30.60 *(22.82)*	2562	2.281 *(8.633)*	0.522 *(0.317)*	13.42 *(2.643)*	194 *(89.7)*	58 *(14.4)*	75 *(23.9)*	....
0.00 *(0.00)*	2659	0.935 *(3.538)*	....	....	166 *(74.2)*	58 *(14.4)*	75 *(23.9)*	....
15.58 *(11.62)*	2612	1.582 *(5.988)*	0.710 *(0.432)*	9.85 *(1.941)*	171 *(76.9)*	57 *(13.9)*	75 *(23.9)*	....
35.21 *(26.26)*	2499	2.546 *(9.639)*	0.506 *(0.308)*	13.83 *(2.724)*	199 *(92.8)*	57 *(13.9)*	74 *(23.3)*	....
7.86 *(5.86)*	2635	1.230 *(4.657)*	1.095 *(0.666)*	6.39 *(1.259)*	167 *(75.0)*	58 *(14.4)*	77 *(24.7)*	....
23.14 *(17.25)*	2583	1.921 *(7.270)*	0.581 *(0.353)*	12.05 *(2.373)*	182 *(83.1)*	58 *(14.4)*	76 *(24.2)*	....
Av 18.73 ***Av (13.97)***	**2592**	**1.749** ***(6.621)***	**0.653** ***(0.397)***	**10.71** ***(2.110)***	**180** ***(81.9)***	**58** ***(14.3)***	**75** ***(24.0)***	**28.94** ***(97.71)***

DRAWBAR PERFORMANCE

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F *(°C)* Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 8th (3-2) Gear											
30.10 *(22.44)*	1977 *(8.79)*	5.71 *(9.19)*	2500	6.85	2.558 *(9.683)*	0.595 *(0.362)*	11.77 *(2.318)*	182 *(83.1)*	46 *(7.8)*	57 *(13.6)*	28.94 *(97.71)*
75% of Pull at Maximum Power—Ten Hours 8th (3-2) Gear											
24.45 *(18.24)*	1530 *(6.81)*	5.99 *(9.65)*	2576	5.02	2.202 *(8.336)*	0.630 *(0.383)*	11.11 *(2.188)*	176 *(79.7)*	46 *(8.0)*	57 *(13.9)*	28.87 *(97.49)*
50% of Pull at Maximum Power—Two Hours 8th (3-2) Gear											
16.77 *(12.51)*	1020 *(4.54)*	6.17 *(9.92)*	2611	3.55	1.793 *(6.789)*	0.748 *(0.455)*	9.35 *(1.842)*	173 *(78.3)*	48 *(8.6)*	59 *(14.7)*	28.88 *(97.52)*
50% of Pull at Reduced Engine Speed—Two Hours 10th (4-1) Gear											
16.78 *(12.52)*	1021 *(4.54)*	6.17 *(9.93)*	1550	3.52	1.365 *(5.166)*	0.569 *(0.346)*	12.30 *(2.423)*	172 *(77.5)*	48 *(8.6)*	59 *(15.0)*	28.86 *(97.46)*
MAXIMUM POWER IN SELECTED GEARS											
29.01 *(21.63)*	3728 *(16.58)*	2.92 *(4.70)*	2516	14.88	6th (2-3) Gear			177 *(80.3)*	43 *(6.1)*	48 *(8.9)*	28.97 *(97.83)*
30.60 *(22.82)*	2623 *(11.67)*	4.38 *(7.04)*	2501	9.14	7th (3-1) Gear			176 *(79.7)*	45 *(7.2)*	51 *(10.6)*	28.97 *(97.83)*
31.01 *(23.13)*	2040 *(9.07)*	5.70 *(9.18)*	2500	6.91	8th (3-2) Gear			178 *(81.1)*	45 *(7.2)*	52 *(11.1)*	28.97 *(97.83)*
31.11 *(23.20)*	1670 *(7.43)*	6.99 *(11.24)*	2500	5.52	9th (3-3) Gear			179 *(81.4)*	45 *(7.2)*	53 *(11.7)*	28.97 *(97.83)*
30.99 *(23.11)*	1175 *(5.22)*	9.89 *(15.92)*	2501	3.93	10th (4-1) Gear			179 *(81.7)*	45 *(7.2)*	55 *(12.8)*	28.97 *(97.83)*

Department of Agricultural Engineering

Dates of Test: March 30 to April 9, 1984

Manufacturer: ISHIKAWAJIMA-SHIBAURA MACHINERY COMPANY, LTD., Tokyo, Japan

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 46.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60° *(15°/15°)*** 0.8405 **Fuel weight** 6.998 lbs/gal *(0.839 kg/l)* **Oil SAE** 30 **API service classification** SE, SF, CC, CD **To motor** 1.797 gal *(6.803 l)* **Drained from motor** 1.667 gal *(6.311 l)* **Transmission and final drive lubricant** Ford 134 fluid **Total time engine was operated** 37.5 hours.

ENGINE: Make Shibaura Diesel **Type** four cylinder vertical **Serial No.** *T854B-10141* **Crankshaft** lengthwise **Rated rpm** 2500 **Bore and stroke** 3.346″ × 3.937″ *(85 mm × 100 mm)* **Compression ratio** 21 to 1 **Displacement** 138.5 cu in *(2270 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** one paper element **Oil filter** one full flow cartridge **Fuel filter** one paper element **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type standard **Serial No.** *2110*UV00085* **Tread width** rear 48.0″ *(1219 mm)* to 71.8″ *(1824 mm)* front 48.0″ *(1219 mm)* to 72.0″ *(1829 mm)* **Wheel base** 73.4″ *(1864 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 28.2″ *(716 mm)* Vertical distance above roadway 30.3″ *(770 mm)* Horizontal distance from center of rear wheel tread 0.2″ *(5 mm)* to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio-Synchromesh **Advertised speeds mph *(km/h)*** first 1.0 *(1.6)* second 1.3 *(2.1)* third 1.6 *(2.6)* fourth 2.3 *(3.7)* fifth 3.0 *(4.8)* sixth 3.6 *(5.8)* seventh 5.0 *(8.0)* eighth 6.4 *(10.3)* ninth 7.8 *(12.6)* tenth 10.8 *(17.4)* eleventh 13.7 *(22.0)* twelfth 16.5 *(26.6)* reverse 1.4 *(2.3)*, 3.1 *(5.0)*, 6.9 *(11.1)*, 14.7 *(23.7)* **Clutch** single dry disc operated by foot pedal **Brakes** drum and shoe operated by two foot pedals which can be locked together **Steering** power assist **Turning radius** (on concrete surface with brake applied) right 114.2″ *(2.90 m)* left 114.2″ *(2.90 m)* (on concrete surface without brake) right 125.0″ *(3.18 m)* left 125.0″ *(3.18 m)* **Turning space diameter** (on concrete surface with brake applied) right 235″ *(5.96 m)* left 235″ *(5.96 m)* (on concrete surface without brake) right 256″ *(6.50 m)* left 256″ *(6.50 m)* **Power take-off** 540 rpm at 2394 engine rpm.

LUGGING ABILITY IN 8th (3-2) GEAR

Crankshaft Speed rpm	2500	2256	1997	1746	1496	1242
Pull—lbs *(kN)*	2040 *(9.07)*	2235 *(10.02)*	2399 *(10.75)*	2373 *(10.64)*	2450 *(10.98)*	2414 *(10.82)*
Increase in Pull %	0	10	18	16	20	18
Power—Hp *(kW)*	31.01 *(23.13)*	30.44 *(22.70)*	28.76 *(21.45)*	24.85 *(18.53)*	21.92 *(16.35)*	17.96 *(13.39)*
Speed—Mph *(km/h)*	5.70 *(9.18)*	5.11 *(8.22)*	4.50 *(7.24)*	3.93 *(6.32)*	3.36 *(5.40)*	2.79 *(4.49)*
Slip %	6.91	7.61	8.04	8.25	8.57	8.25

TRACTOR SOUND LEVEL WITHOUT CAB	**dB(A)**
Maximum Available Power—Two Hours	92.0
75% of Pull at Maximum Power—Ten Hours	91.5
50% of Pull at Maximum Power—Two Hours	92.0
50% of Pull at Reduced Engine Speed—Two Hours	85.5
Bystander in 12th (4-3) gear	82.5

TIRES, BALLAST AND WEIGHT		**With Ballast**	**Without Ballast**
Rear Tires	—No., size, ply & psi *(kPa)*	Two 13.6-28; 4; 14 *(95)*	Two 13.6-28; 4; 14 *(95)*
Ballast	—Liquid (each)	425 lb *(193 kg)*	None
	—Cast Iron (each)	250 lb *(113 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 6.00-16; 4; 32 *(220)*	Two 6.00-16; 4; 32 *(220)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	50 lb *(23 kg)*	None
Height of Drawbar		16.5 in *(420 mm)*	16.5 in *(420 mm)*
Static Weight with Operator—Rear		3650 lb *(1656 kg)*	2300 lb *(1043 kg)*
—Front		1460 lb *(662 kg)*	1360 lb *(617 kg)*
—Total		5110 lb *(2318 kg)*	3660 lb *(1660 kg)*

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 141°F *(60.6°C)*. Five gears were chosen between 15% slip and 10 mph *(16.1 km/h)*. During inspection, it was found that the intake valves and valve seats on cylinders 1, 2 and 3 had adhesive wear markings (metal transfer).

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1510,** June 14, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

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Ford 2110 (12x4) Synchro Diesel

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